conference, and in the afternoon a similar one—the third of its kind—was opened. Three papers were read, the first of which, on the tyranny of Greek, was by Mr. J. Talbot, of Harrow. He said that the amount of Greek which boys did at school was too small to be of any use, and he suggested that its place should be taken by English and by science, though from the latter alone he considered that it was impossible to obtain literary style. Sir Michael Foster pleaded for elasticity of curriculum and no compulsory Greek, though he did not define what he would substitute for it. Prof. Armstrong argued that if science was studied, literary style could be acquired at the same time. In the end, the meeting agreed that compulsory Greek should not be required of candidates for entrance examinations at the universities.

Mr. E. C. Sherwood, of Westminster, in his address dealt with how to make practical work of any use in "a low big form." He was of opinion that lectures should be used to sum up and criticise the work of the previous lesson. Text-books in the laboratory he considered a snare and a delusion, and he maintained that notes should be roughly written at the time and copied out carefully in ink afterwards. In the discussion, however, a number of speakers characterised it as a mistake for any notes to be made away from the laboratory. Furthermore, Mr. Sherwood laid down that the aim of the very earliest course of chemistry and physics, especially if not preceded by a course of "nature-study," should be to train the powers of observation and description, as well as to give a familiarity with the nature and properties of the commoner substances and materials, and the object and application of the easier methods of manipulation. The "problem" and the heuristic element should not be prominent features.

The third paper consisted of a criticism, by Dr. T. J. Baker, of Birmingham, on the new syllabus for science in the matriculation examination of the University of London. In this contribution, it was pointed out that it is now possible to matriculate at London without offering any science at all. It was contended that a matriculation examination should test the grounding of candidates in this as well as in literary subjects. At the same time, there should be no incentive to specialisation as in the new science syllabus under consideration.

This contention was borne out by the fact that chemistry has been separated from physics and the latter divided into two sections each of which counts as a distinct subject. The standard of attainment required is too high and directly encourages specialisation. Dr. Baker would retain only chemistry and mechanics, the syllabus in the first case being limited in scope, but insisting upon thoroughness of treatment.

Sir A. W. Rücker, in the course of a well-considered speech, explained that the syllabus complied with Sir Michael Foster's desire for elasticity. He alluded to the difficulty of examining 2500 candidates practically at a fixed centre, and showed how the University had arranged to test the pupils of a school on the spot by means of the leaving examination recently devised.

Wilfred Mark Webb.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

Sir Michael Foster has decided to retain his seat in Parliament as member for the University of London. In a letter to Sir John Rotton, he says:—"The answers which you have received to the inquiry which you kindly made on my behalf give me so fully the assurance which I needed in order that I should feel justified in renouncing my intention to resign that I have decided to do so."

Sir William Turner, K.C.B., F.R.S., who has held the chair of anatomy in the University of Edinburgh since 1867, has been elected principal of the University.

The *Lancet* states that the Bristol Health Committee has decided that the bacteriological work which has been done hitherto in the medical officer's department shall be for one year transferred to the University College, where it will be carried on by Prof. Stanley Kent at a cost of 200*l.*

A laboratory has been opened in the gardens of the Royal Botanic Society at Regent's Park, in which classes for instruction in botany and horticultural chemistry are held three days a week. Mr. E. J. Schwartz, demonstrator in botany at King's College, has been appointed director, and has now completed arrangements for the reception of pupils. The laboratory has been erected and equipped under the auspices of the Technical Education Board.

The Carnegie Institution of Washington has adopted, *Science* says, a plan to encourage exceptional talent by appointing a certain number of research assistants. As a rule, the annual emolument will not exceed 200*l.*, and no limitations are prescribed as to age, sex, nationality, graduation or residence. A person appointed will generally be expected to work under the supervision of a man of science known to the authorities of the Carnegie Institution. Applications for appointments may be presented by the head of a college, or by a professor, or by the candidate; they should be accompanied by a statement of the qualification of the candidate, of the research work he has done and of that which he desires to follow; also of the time for which an allowance is required.

In a speech made at the opening of the Indian Industrial Exhibition in connection with the eighteenth Indian National Congress, the Gaekwar of Baroda referred to the question of education in India. The *Pioneer Mail* says that his Highness founded an institution called the Kala-Bhavan with departments in dyeing and weaving, carpentry and mechanical engineering, and with the object of diffusing technical education had branches of it set up in the various parts of the Raj; but the response among the people was so faint that after a time the institution had to be contracted within narrower limits. Until the means of the people and the material wealth of the country expand, there can be but little demand for the work which such institutes turn out. So far, the Kala-Bhavan has done but little beyond providing skilled dyers for Bombay mills.

SCIENTIFIC SERIAL.

Journal of Botany, January.—Mr. E. S. Salmon traces out the characters and history of several mosses which, after a careful examination, he considers should be included under the species *Calyptopogon mnioides*, Schwaeg. The type specimen was collected in Chili, but others were obtained in Ecuador, Patagonia, New Zealand, Tasmania and Australia. This distribution is paralleled in the case of several other mosses, and a similar range was described for certain phanerogamous plants by Sir W. J. Hooker. The identity of these variously named forms receives confirmation by the presence of gemmæ which arise on the leaves.—Mr. E. G. Baker discusses Turræa, a genus belonging to the Meliaceæ, and in the main follows the classification laid down by Dr. Harms in the "Pflanzenfamilien." The African and Mascarene species are arranged separately, and in the former appear descriptions of two new species.—Two Hepatics new to Britain are recorded. *Kantia submersa* was gathered by Messrs. A. Wilson and J. A. Wheldon on Cockerham Moss, west Lancashire, and *Geocalyx graveolens* was discovered by Mr. S. M. Macvicar, in west Ross-shire.—Miss A. L. Smith, in the course of her description of a gooseberry disease caused by a form of Botrytis, mentions the appearance of a Peziza growing from a sclerotium, which also gave rise to *Sclerotinia Fuckeliana.*—A note on the localities of *Acorus Calamus* is contributed by Mr. Arthur Bennett.—A supplement to the *Journal* is devoted to notes on the drawings for "English Botany," by Mr. F. N. A. Garry. This work, generally known as Sowerby's "English Botany," bears tribute to the artist who drew the plates; the descriptions of the first edition were almost entirely written by Sir James E. Smith.

SOCIETIES AND ACADEMIES.

London.

Royal Society, December 11, 1902.—"On Certain Properties of the Alloys of the Gold-Silver Series." By the late Sir William **Roberts-Austen**, K.C.B., F.R.S., and Dr. T. Kirke **Rose**.

The earliest trial plate for testing the composition of the gold coinage was made in 1527, the year following the first introduction of the standard 916·6. This plate contained only 6·2 parts per 1000 of copper and was probably intended to consist of gold and silver only. All subsequent plates, however, down to that made in 1829, contained much larger amounts of copper.

In 1873, it was determined to omit the silver and to use only copper as the alloying metal, but Sir W. C. Roberts-Austen expressed some doubts at the time whether plates consisting of alloys of gold and copper were uniform in composition, and proposed the use of trial plates of pure gold. There are, however, objections to this method of procedure, and the law enjoining the use of standard plates was not altered.

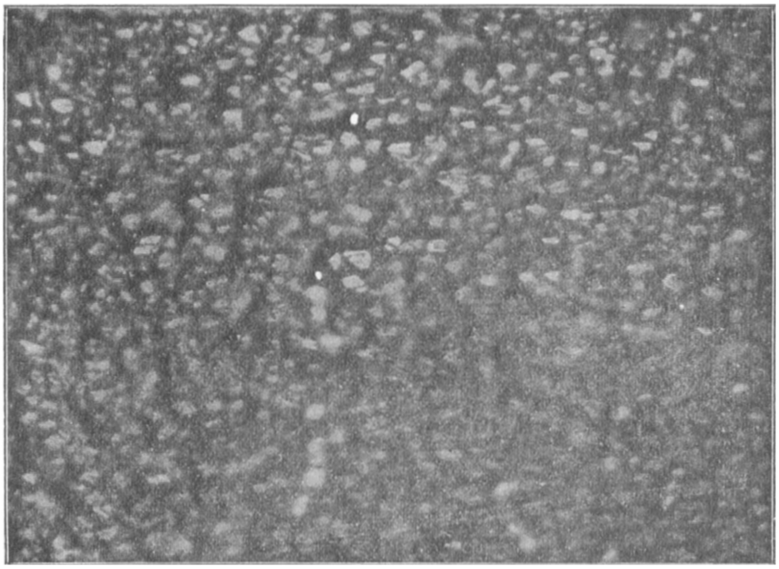

FIG. 1.—Alloy consisting of gold 91·6 per cent., silver 8·3 per cent. Cast. ×1500.

In 1900, the authors of this paper showed that, as had been feared, the gold copper alloys were not homogeneous (*Roy. Soc. Proc.*, vol. lxvii., 1900, p. 105), and experiments on the gold-silver series were then made. Cooling curves of the alloys were taken by the Roberts-Austen recording pyrometer, with the result that all the alloys were found to solidity without passing through a pasty stage and no traces of a eutectic alloy were observed. The first additions of silver to gold do not lower its point of solidification, and the freezing-point curve was shown to be horizontal in passing from pure gold to the alloy containing 50 atoms of silver to 50 of gold. With further additions of silver, there is a steadily increasing fall in the freezing point until the lowest point is reached at pure silver. There is accordingly no reason to suppose that, when alloys rich in gold are allowed to cool from a molten state, the first portion of metal solidified would be different in composition from the mother liquor.

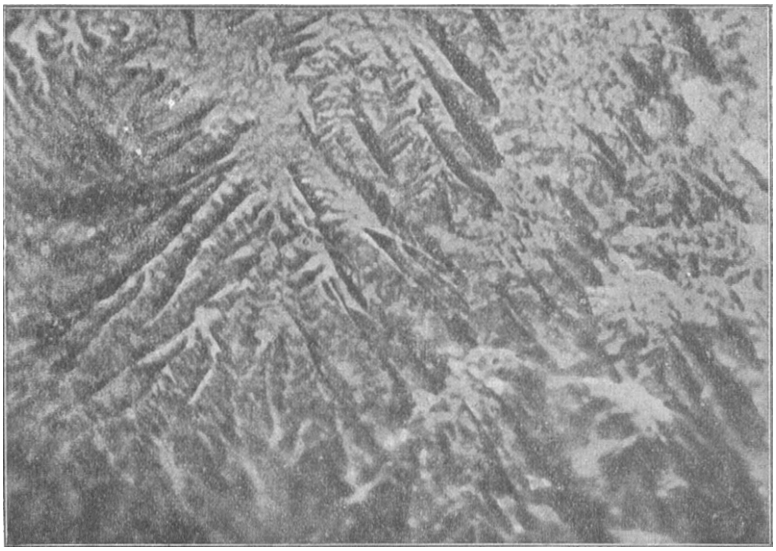

FIG. 2.—Same as Fig. 1. Annealed for two months. ×1500.

The alloys all consist of large grains built up of minute secondary crystals, shown in Fig. 1, in which the alloy containing 916·6 parts of gold and 83·3 of silver is shown under a magnification of 1500 diameters. An ingot of this composition was heated for two months in an annealing furnace at a low red heat, but although the size of the crystals was greatly increased, as shown in Fig. 2, in which the magnification is the same as in Fig. 1, no true segregation could be detected in the ingot either by assay or with the aid of the microscope. Plates prepared by rolling out ingots of standard fineness were found on analysis to be uniform in composition, and they have been used throughout the year 1902 for checks in the assay of standard bars and coin. In view of the minute accuracy with which the operations of coinage have to be conducted, this is a matter of much practical importance.

Royal Astronomical Society, January 9.—Dr. J. W. L. Glaisher, F.R.S., president, in the chair.—Prof. H. H. **Turner** read a preliminary note by Mr. **Bellamy** and himself on the possible existence of two independent stellar systems. The investigation described in a previous paper had been extended to the southern hemisphere and the number of stars in each square degree had been counted; the differences of distribution were apparently best explained by assuming the existence of a belt of stars. This seemed to point to the existence of two superposed stellar systems. It was proposed to make a further study of the solar motion in space, first from stars in the suggested belt and then from stars in the Milky Way.—Mr. A. R. **Hinks** read a paper on a graphical method of applying to photographic measures the terms of the second order in the differential refraction. It appeared that Prof. Turner's method of reducing measures in linear coordinates had the advantage that the small differences (refraction, &c.) are linear functions of the coordinates, but the method loses its simplicity when corrections involve terms of the second order. A graphical method was suggested for finding separately and applying to the measures such parts of the reductions as are of the second order. The author had succeeded in constructing diagrams by means of which these small terms can be quickly found for any plate.—The secretary partly read a paper by Mr. J. E. **Gore** on the sun's stellar magnitude, obtained from a consideration of binary stars the orbits of which were well determined and the spectra of which were of the solar type.—The secretary also gave an account of a paper which had been communicated by the **Astronomer Royal** on statistics of stars in a zone of 5°, from + 65° to + 70° declination, counted on photographs taken for the Astrographic Chart and Catalogue at the Royal Observatory, Greenwich. The paper gave a comparison of the number of stars for each square degree on the photographs with those of the Bonn Durchmusterung, and an analysis of the number of stars in each square degree in terms of duration of exposure.—The **Astronomer Royal** read a paper describing his proposals for the reproduction and publication, on a scale twice that of the original plates, of the photographs for the Astrographic Chart made at the Royal Observatory, Greenwich.—The **Astronomer Royal** also read a note on photographs of Giacobini's comet taken at the Royal Observatory.—Mr. H. C. **Plummer** briefly described the object of his paper on the use of Mr. Aldis's tables of the function $\frac{1}{2}(\theta + \cos\theta)$ in determining the elements of an orbit.—Other papers were taken as read.—A photograph of a Leonid meteor taken by Mr. W. W. Payne at Carleton College Observatory, Northfield, Minnesota, was exhibited on the screen.

Geological Society, January 7.—Prof. C. Lapworth, F.R.S., president, in the chair.—On the discovery of an ossiferous cavern of Pliocene age at Dove Holes, Buxton (Derbyshire), by Prof. W. Boyd **Dawkins**, F.R.S. The Carboniferous Limestone, in the neighbourhood of Dove Holes, has from time to time yielded remains of extinct Mammalia of Pleistocene age. The latest discovery is of a group of Mammalia of far higher antiquity than the Pleistocene. The Victory Quarry, Bibbington, in which the discovery was made, is excavated in a rolling plateau of Carboniferous Limestone. In the course of working the quarry, a cave was discovered. It ran nearly horizontally north and south, and consisted of a large chamber and a small passage, both eroded in a master-joint. It was filled with a horizontally stratified red clay, containing angular and rolled pebbles of limestone, and a few sandstone-pebbles from the Millstone Grit and Yoredale rocks. Scattered through the mass were mammalian bones and teeth, some waterworn and others with sharp fractures. The contents had clearly been introduced into the cave by water, flowing under geographical conditions which no longer exist. The mammalian remains belong to the following species:—*Machairodus crenatidens*, Fabr.; *Hyaena*, sp.; *Mastodon arvernensis*, Croiz. and Job.; *Elephas meridionalis*, Nesli.; *Rhinoceros etruscus*, Falc.; *Equus stenonis*, Nesli.; *Cervus etueriarum*, Croiz. and Job. All these species are found in the Upper Pliocene deposits of France and Italy, and undoubtedly belong to that age. Some of the bones present the characteristic teeth-marks of the hyænas. The author concludes that the animal-remains have been washed out of a hyæna-den, which then existed at a higher level, and carried down deep into the rock, into the cave in which they were found, along with the clay and pebbles brought down in flood-time from the Yoredale and Millstone-Grit hills. The author appends a map illustrating the physical geography of the British Isles in Upper Pliocene time. There were then no physical barriers to forbid the migration of Machairodus, Mastodon, *Elephas meridionalis*, and the rest, from central and southern France into Britain. Over this area, the animals migrated in the Upper Pliocene age. The discovery of a few of them in Derbyshire is to be looked upon as a monument of their former existence over the whole of this region.

Edinburgh.

Mathematical Society, January 9.—On the decimalisation of English money and some simplifications in long division, by J. D. Hamilton **Dickson** and the late J. Hamblin **Smith**.—Note on the preceding paper, by J. W. **Butters**.—Notes on anti-reciprocal points, by A. G. **Burgess**.—On the singular points of plane curves, by Dr. **Sprague**.

Paris.

Academy of Sciences, January 12.—M. Albert Gaudry in the chair.—On some new halogen derivatives of dextrorotatory benzylidenecamphor and benzylcamphor, by MM. A. **Haller** and J. **Minguin**. By the addition of hydrobromic acid to benzylidenecamphor, a compound is obtained which can be clearly distinguished from the benzylbromocamphors by the different products obtained on opening up the camphor ring.—On the glycolysis of the blood *in vitro*, by MM. R. **Lépine** and **Boulud**.—The president announced to the Academy the loss by death of M. Sirodot, correspondent in the section of botany.—The variations in the activity of reduction of oxyhæmoglobin in the course of a balloon ascent, by M. **Tripet**. Observations were made at altitudes up to 5000 metres on three subjects, with the following results. At great altitudes, the duration of reduction of the oxyhæmoglobin diminishes to less than one-half of the normal time of reduction, this diminution in the balloon in the absence of all fatigue being nearly instantaneous. In all three subjects, the proportion of oxyhæmoglobin increased with the height. As the balloon approached the earth, the converse phenomena were noted, but the return to the normal was slow and was not completed on arriving at the surface of the earth. The results of observations on the arterial blood-pressure at varying heights are also given.—On a reciprocal transformation in mechanics, by M. Paul J. **Suchar**.—On the existence in certain differential systems of integrals responding to given initial conditions, by M. Ch. **Riquier**.—On the singular trajectories of the problem of three bodies, by M. T. **Levi-Civita**.—On graphical statics in space, by M. B. **Mayor**.—Resistivity and temperature, by M. **Ponsot**.—On two silicides of manganese, by M. P. **Lebeau**. The existence of a manganese silicide, MnSi, in steel has been indicated by MM. Carnot and Goutal, and of a silicide, $SiMn_2$, by M. Vigouroux, but neither of these has been isolated in a state of purity. It has been shown in a previous paper that copper silicide can be utilised in the preparation of the silicon compounds of iron and cobalt, and the same reaction applies equally wel to the study of the silicides of manganese.—On the expansion of tempered steels, by MM. Georges **Charpy** and Louis **Grenet**. The results of M. Svedelins on the contraction and variation in the coefficient of expansion of annealed and tempered steels are to a certain extent confirmed, but the differences found in the coefficients of expansion are not so great.—On the chloride of cinnamylidene, by MM. Ernest **Charon** and Edgar **Dugoujon**. This is produced by the interaction of cinnamic aldehyde and phosphorus pentachloride under certain conditions which are described. The compound is very unstable and is readily acted upon by water or moist air. The addition products with chlorine and bromine are described.—The action of sodium on iodophenoxypropane, by M. l'Abbe J. **Hamonet**.—On the use of nitrates for the characterisation of sweet wines, by M. **Curtel**. Advantage is taken of the presence of nitrates in sugar from the beet to detect the addition of sugar to wine.—On some cephalopods collected during recent voyages of the Prince of Monaco, by M. L. **Joubin**.—On two new types of parasitic Epicaridæ, by M. Jules **Bonnier**.—The fossil fishes of Belgium, by M. Maurice **Leriche**.—Preliminary note on the geology of the Isle of Eubée, by M. **Deprat**.—On glacial observations made in Upper Maurienne in the summer of 1902, by M. Paul **Girardin**.—The phenomenon of pyrenolysis in the cells of the hepato-pancreatic gland of *Europagurus Bernardus*, by M. L. **Launoy**.—Organic sexual dimorphism in the Gallinaceæ and its variation with feeding, by M. Frédéric **Houssay**.—On the presence of saccharose in almonds and on its function in the formation of oil, by M. C. **Vallée**.—On the formation of the purple of *Purpura lapillus*, by M. Raphaël **Dubois**. The author holds, contrary to the views expressed by M. Letellier, that the mechanism of formation of the colouring matter in Purpura is the same as in the genus Murex, and is the result of the activity of a zymase, to which the name of purpurase is given.—Researches on the influence of variations of altitude on the respiratory exchanges, by M. J. **Tissot**. A table of the experimental results obtained by two observers in a captive balloon is given, the discussion of the results being reserved for a future note.—A comparative study of the activity of production of glycose by striated muscle, by MM. **Cadéac** and **Maignon**.—On the calculation of the amount of water added and cream removed in milk analyses, by MM. **Louise** and Ch. **Riquier**. A criticism of a formula of M. Génin. It is necessary to take into account the change of volume produced by the removal of cream.—Remark on the origin of volcanic activity, by M. Stanislas **Meunier**. Remarking on the views recently put forward by M. Gautier, the author points out that they are identical with those put forward by him some time ago.

New South Wales.

Linnean Society, November 26, 1902.—Mr. J. H. Maiden, president, in the chair.—Studies on Australian Mollusca, part vii., by Mr. C. **Hedley**. An examination of the history of nomenclature shows that the current names of many well-known marine forms are defective. *Purpura amygdala* is shown to apply properly to a West Australian species; the Sydney shell usually so called is described as *P. pseudamygdala* *Venus australis*, Sowerby, is replaced by *Chione lagopus*, Lamarck, and *Capulus danieli* of Angas (not Crosse) by *C. australis*, Lamarck. A new species of Cæcum, lately discovered by Miss Parker, is added to the fauna under the name of *C. lilianum*.

Some hitherto unfigured Victorian land shells are also illustrated. Finally, the species of Triforis dwelling on the coast of New South Wales are reviewed, the total being raised from four to fourteen, including nine new species.—Notes on Prosobranchiata, No. ii., Littorinacea, by Mr. H. Leighton **Kesteven.** While studying the affinities of Fossarina and Risellopsis, the writer found that Risella differed in important anatomical characters from Littorina, the type genus of the family to which, in the past, it had been assigned. As a result of studying Risella, Littorina and Tectarius and comparing their anatomy with that of other Tænioglossa, he has found it advisable to reclassify the littorine groups thereof.—Notes on Australian Rhopalocera: Lycænidæ, part ii., by Mr. G. A. **Waterhouse.** One species of Pseudonotis and two of Philiris are described as new.—Ngarrabul and other Australian tribes, part i., medical and surgical practice, by Mr. John **MacPherson.** Before the advent of the white settler, the Blacks affirm that there was but little sickness or disease of any kind. Tumours or neoplasms were unknown. The work of the doctors was mainly surgical, and consisted of the treatment of wounds or injuries—the result of accident or sustained in warfare. Sorcery and witchcraft, however, occupied a prominent place in the practice of medicine. Knocking out the incisor teeth, circumcision and subincision were not in vogue among the Ngarrabul Blacks, and no instances of perforation of the septum nasi were met with. Particulars relating to the materia medica are recorded.—On the occurrence of Monograptus in New South Wales, by Mr. T. S. **Hall.** The occurrence of Graptolites in the Silurian rocks of Bowning and Yass has already been recorded by Mr. John Mitchell in the Society's *Proceedings* (1886, p. 577; 1880, 150). A careful study of the specimens on which these records were based shows that they are undoubted examples of Monograptus. The imperfection of the specimens in the sicular region prevents absolute identification, but, so far as can be made out, they apparently belong to the group typified by *M. dubius*, which ranges through almost the whole of the Lower Ludlow and Wenlock in Britain.—On a new species of Symplocos from New South Wales, by Mr. R. T. **Baker.** This new Symplocos is a small, glabrous shrub of about 6 to 9 feet high, and differs considerably in general facies from the three species *S. spicata*, Roxb., *S. Stawelli*, F.v.M., *S. paucistaminea*, F.v.M., already described from Australia.

DIARY OF SOCIETIES.

THURSDAY, JANUARY 22.

ROYAL SOCIETY, at 4.30.—Preliminary Note on the Relationships between Sun-spots and Terrestrial Magnetism: Dr. C. Chree, F.R.S.—Characteristics of Electric Earth-Current Disturbances, and their Origin: J. E. Taylor.—Solar Eclipse of 1900, May 28. General Discussion of Spectroscopic Results: J. Evershed.—Some Dielectric Properties of Solid Glycerine: Prof. E. Wilson.—On the Electrodynamic and Thermal Relations of Energy of Magnetisation: Dr. J. Larmor, Sec. R.S.

SOCIETY OF ARTS, at 4.30.—Indian Domestic Life: J. D. Rees.

ROYAL INSTITUTION, at 5.—Pre-Phœnician Writing in Crete and its Bearings on the History of the Alphabet: Dr. A. J. Evans, F.R.S.

INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—Discussion on the Metric System. Opened by Mr. Alexander Siemens, in favour of the Metric System, and by Sir Frederick Bramwell, Bart., in favour of the British System.

FRIDAY, JANUARY 23.

ROYAL INSTITUTION, at 9.—Recent Volcanic Eruptions: Dr. Tempest Anderson.

PHYSICAL SOCIETY, at 5.—On the Oscillating Table for determining Moments of Inertia: W. H. Derriman.—Note on an Elementary Treatment of Conducting Network: Prof. L. R. Wilberforce.—On the Theory of the Quadrant Electrometer: G. W. Walker.

SATURDAY, JANUARY 24.

MATHEMATICAL ASSOCIATION, at 2.—On some Class Diagrams for Intuitional Geometry: E. M. Langley.—On the Representation of Imaginary Points on a Plane by Real Points: Prof. A. Lodge.—Incommensurables by Means of Continuous Decimals: Edwin Budden.

MONDAY, JANUARY 26.

ROYAL GEOGRAPHICAL SOCIETY, at 8.30.—Irrigation and Colonisation in British East Africa: R. B. Buckley.

INSTITUTE OF ACTUARIES, at 5.—Temporary Assurances: W. P. Elderton.

TUESDAY, JANUARY 27.

ROYAL INSTITUTION, at 5.—The Physiology of Digestion: Prof. Allan Macfadyen.

INSTITUTION OF CIVIL ENGINEERS, at 8.—The Nile Reservoir, Assuan: M. Fitzmaurice, C.M.G.—Sluices and Lock-Gates of the Nile Reservoir, Assuan: F. W. S. Stokes.

ANTHROPOLOGICAL INSTITUTE, at 8.—Presidential Address. The Position of Anthropology and its Needs: Dr. A. C. Haddon, F.R.S.

WEDNESDAY, JANUARY 28.

SOCIETY OF ARTS, at 8.—The Cost of Municipal Trading: Dixon H Davies.

THURSDAY, JANUARY 29.

ROYAL SOCIETY, at 4.30.—*Probable Papers:*—Relation between Solar Prominences and Terrestrial Magnetism: Sir Norman Lockyer, F.R.S., and Dr. W. J. S. Lockyer.—On the Bending of Electric Waves round a Conducting Obstacle: H. M. Macdonald, F.R.S.—On the Decline of the Injury Current in Mammalian Nerve, and its Modification by Changes of Temperature: Miss S. C. M. Sowton and J. S. Macdonald.

ROYAL INSTITUTION, at 5.—Pre-Phœnician Writing in Crete and its Bearings on the History of the Alphabet: Dr. A. J. Evans.

FRIDAY, JANUARY 30.

ROYAL INSTITUTION, at 9.—Vibration Problems in Engineering Science: Prof. W. E. Dalby.

INSTITUTION OF CIVIL ENGINEERS, at 8.—The Design of the Electrical Equipment of a Light Railway: J. R. MacIntosh.

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